

## **22-9: Experimental Validation of Charged Lunar Dust Dynamics Simulants**

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**Activity Type:** Continuing (FY20 CIF Electrostatic Charge on Lunar Regolith)

**Primary STMD Taxonomy:** TX07.2.5 Particulate Contamination Prevention and Mitigation

**Start TRL:** 3

**End TRL:** 4

**Executive Summary:** The goal of this work is to experimentally verify the electrostatic interaction physics that have been incorporated into the discrete element method (DEM) modeling software package during the FY20 CIF project titled “Charged Particle Dynamics in the Lunar Environment.” Current state-of-the-art (SOA) granular gas dynamics models used to explain rocket plume impingement physics have not taken into account the natural or induced electrostatic environment of the lunar surface, nor the effect of charged regolith grains being present in the plume plasma. This work improved upon the SOA by adding long-range and contact inter-particle electrostatic interactions to a granular mechanics DEM modeling software package. Tribocharging mechanics between spherical particles has been experimentally examined along with the natural electrostatic plasma environments produced via emission from an electron gun and ultraviolet lamp.